

# ADDITIONS TO THE NATIVE VASCULAR FLORA OF THE OLYMPIC PENINSULA, WASHINGTON

NELSA M. BUCKINGHAM

1127 West 7th Street, Port Angeles, WA 98362

EDWARD L. TISCH

Department of Biological Science, Peninsula College,  
Port Angeles, WA 98362

## ABSTRACT

Although Olympic Peninsula plants were among the first in the Pacific Northwest to be seen by a European botanist (Archibald Menzies, May 1792), comparatively little botanical attention has been given to the area since then. This paper notes the addition of more than a hundred native taxa that are not attributed to the Peninsula in standard floras of the area (Piper 1906, Piper and Beattie 1915, Frye 1934, Jones 1936, Abrams and Ferris 1940–1960, Hitchcock et al. 1955–1969, Hitchcock and Cronquist 1974) or in other floras whose ranges sometimes include or closely approach the Peninsula (Henry 1915, Hultén 1968, Welsh 1974, Fernald 1970). A number of these additions are included in the regionally published catalog of vascular plants of this area (Buckingham and Tisch 1979).

The Olympic Peninsula is that part of the northwest corner of Washington lying north of the Chehalis River and the southern reach of Puget Sound, but omitting the Kitsap Peninsula. Within its 15,500 km<sup>2</sup> are the Olympic Mountains, with peaks to 2400 m. The climate is oceanic, but with a drastic precipitation gradient from 40 cm in the rain shadow to 600 cm on Mt. Olympus. Endemism, disjunction, and deviations from the described parameters of many taxa are characteristic of the flora, resulting, in part from isolation and the presumed existence of glacial refugia.

The area challenges many aspects of botanical investigation. Most of the Olympic Mountains, plus the extensive Ocean Strip, comprise the Olympic National Park. The world-wide ecological significance of this Park has led to its designation as a World Heritage Site and a Biosphere Reserve. The floristically rich eastern and southern Olympics are managed and protected by the Olympic National Forest. The authors hope that this paper will stimulate the interest of botanists in this isolated, but readily accessible region.

The known Olympic Peninsula distribution is given for all plants. When the presence of the plant is considered somewhat exceptional, in view of general ranges stated in the floras, additional data are provided. These include pertinent parts of the general range and [in brackets] closer occurrences of which we are aware through herbarium

and literature search. Nomenclature follows Hitchcock and Cronquist (1974), except where authorities are listed.

All herbarium citations represent Olympic Peninsula collections. Specimens of all listed taxa are in the personal herbarium of the senior author or that of the Olympic National Park, unless one or both are specifically excepted. Both are accessible by appointment or inquiry. Other herbarium specimens of listed plants are cited. Those herbaria not included in the Index Herbariorum are indicated by the use of lower case letters, as follows: (nmb)—Nelsa M. Buckingham, Port Angeles, WA; (onp)—Olympic National Park, Port Angeles, WA; (pc)—Peninsula College, Port Angeles, WA; (plu)—Pacific Lutheran University, Tacoma, WA; (smc)—St. Martin's College, Olympia, WA; (ups)—University of Puget Sound, Tacoma, WA.

Certain frequently recurring geographical areas are abbreviated as follows: BC—British Columbia; Cas—Cascades; OM—Olympic Mountains; OP—Olympic Peninsula; VI—Vancouver Island.

## LYCOPHYTA

### Lycopodiaceae

*Lycopodium annotinum*. Moist, cool forest and forest openings, northeast OM, 915–1372 m: (pc, WTU). [Cas.]

*Lycopodium complanatum*. Moist open woods, northeast OM, 685–1402 m: (pc). [Cas.]

*Lycopodium inundatum* var. *inundatum*. Shore of Lk. Ozette, 11 m: (WS, not at onp).

### Isoetaceae

*Isoetes maritima* Underw. In water, Lk. Ozette, 10.5 m: (not at onp). South along the coast to Alberni, central VI. The taxonomy of the genus in BC is under study by D. M. Britton and A. and O. Ceska. The Ceskas have determined that three taxa are represented in our OP collections, as follows: *Isoetes echinospora* Dur. sensu lato (incl. *I. muricata* Dur.); *I. flettii* (A. A. Eaton) Pfeiffer; *I. maritima* Underw. The first two are apparently the plants referred to as *Isoetes braunii* Dur. and *I. piperi* A. A. Eaton in Jones (1936). *Isoetes maritima* is apparently a first collection for the OP.

## SPHENOPHYTA

### Equisetaceae

*Equisetum* × *ferrissii*. Upper beach, dunes, and sandy bluffs, Mukkaw Bay, Lk. Ozette, and Discovery Bay, 5 to 50 m: (WS).

*Equisetum variegatum* var. *variegatum*. Lake shores and boggy mead-

ows, north to east OM, 1082–1645 m: (pc, WS). [Southern VI (Taylor 1963).]

#### PTEROPHYTA

##### Ophioglossaceae

*Botrychium boreale*. Subalpine meadow above Silver Lk., 1830 m, and moist woods, Copper Cr., 1295 m. [Cas.]

##### Polypodiaceae

*Dryopteris filix-mas*. Mt. Olympus, 1830 m: (WTU, not at nmb or onp). [Mt. Rainier (Frye 1934).]

*Polypodium hesperium*. Lang (1969) divides this taxon into two entities: *Polypodium hesperium*, occurring only east of the Cas, and *P. amorphum* Suksd. (*P. montense* Lang) to the west. *Polypodium amorphum* is common on the OP, but *P. hesperium* has been collected on the base of a tree trunk at Whiskey Cr., 10 m, and on seastacks, northwest OP, 5–24 m: (WS, not at onp).

#### ANTHOPHYTA—MONOCOTYLEDONEAE

##### Alismataceae

*Sagittaria latifolia*. Wet places near Sequim Bay, in the Satsop drainage, and at Lk. Ozette, 6–100 m: (WS, WTU).

##### Cyperaceae

*Carex aperta*. Seasonally flooded meadows, southeast OP, 67 and 245 m: (pc). [Skamania Co. and Kittitas Co. (Standley 1981).]

*Carex aquatilis*. Wet places, north and southeast OP, 11–780 m. Generally in and east of the Cas.

*Carex disperma*. Bogs and streambanks, northeast OM, 790–1495 m: (pc). Generally east of the Cas crest.

*Carex interior*. Wet sedge meadows, north and east sides of the OP, 230–960 m.

*Carex interrupta*. River banks, south and northwest OP, 37–46 m: (WTU). Generally lower Columbia R. and south. [Duncan, VI (Henry 1915); lower Fraser R., BC, and Thurston Co. (Standley 1981).]

*Carex lasiocarpa* var. *americana*. Boggy margin of Wentworth Lk., Ozette area 25 m. [VI (Henry 1915); Seattle (Piper 1906).]

*Carex limnophila*. Wet places, north and central OM, 790–1400 m: (pc). [North Cas (Douglas et al. 1973).]

*Carex neurophora*. Wet meadows and streambanks, east OM, 1280–1495 m: (WS, WTU). [Mt. Rainier.]

*Carex obtusata*. Dry ridges, northeast OM, 1675–2027 m: (pc, WTU).

- East of the Continental Divide in the U.S. [Bridge Cr., Fraser R., BC (Henry 1915).]
- Carex unilateralis*. Seasonally flooded meadows, north and southeast OP, 60 and 245 m: (WS, WTU).
- Carex vulpinoidea*. Muddy sandbar, Lower Skokomish R., 25 m. Generally east of the Cas crest. [Goldstream, VI.]
- Cyperus aristatus*. Lake shore, Shelton area, 60 m: (pc, V).
- Eleocharis acicularis*. Wet lake margins, northwest and southeast OP, 10.5 and 60 m: (WTU).
- Eriophorum polystachion*. Lake shores and bogs, N. Fork Quinault, upper Dungeness, and Lake Cr. drainages, 1220–1645 m: (plu).
- Scirpus cyperinus* var. *brachypoda*. Wet areas, southeast OP, Quinault Res., and Lk. Ozette, 15–229 m. Southeast BC and east. [Whatcom Co. (Taylor et al. 1973); southwest BC, including VI.]
- Scirpus subterminalis*. Shallow pond, Lk. Ozette, 11 m.

#### Hydrocharitaceae

- Elodea nuttallii*. Drainage channel, Copalis area, 9 m. [Hick's Lk., Thurston Co.]

#### Juncaceae

- Juncus supinus*. Extensive, dense population on margins, spring-fed gravelly flat, and in moving water of long-abandoned gravel pit about 9.6 km southeast of Neilton; present also on pond margin of old gravel pit about 6 km west, 45 m: (V, WS, WTU). Apparently known in U.S. only from near Duvall, Snohomish Co. [Near Sultan, Snohomish Co. (Taylor et al. 1978).]

#### Orchidaceae

- Habenaria greenii*. Dry bank, Lk. Crescent, 180 m, and "cliff, Port Crescent, Clallam Co.": (WS).

#### Poaceae

- Agropyron caninum* subsp. *majus* var. *andinum*. Dry subalpine meadows, Mt. Angeles area, 1525 and 1675 m: (WTU).
- Agropyron caninum* subsp. *majus* var. *latiglume*. Dry subalpine meadows, northeast OM, 1675–1965 m (pc, WTU). Generally east of the Cas. [Southern VI.]
- Glyceria borealis*. Margin of Sandy Shore Lk., northeast OP, 120 m.
- Glyceria striata* var. *stricta*. Sandbar, Satsop R., 30 m: (not at onp). [Whatcom Co.]
- Hierochloe odorata*. Streamsides and wet meadows, northeast OM, 1370–1645 m. [Burlington, Skagit Co.]
- Panicum capillare* var. *occidentalis*. Wet places, Shelton area, 60 m: (pc, V).

- Poa grayana*. Olympic plants key most closely to this taxon. Subalpine rock outcrops and moist meadows, north and east OM, above 1495 m: (pc, WTU). Cas.
- Poa nervosa* var. *wheeleri*. Steep, thinly forested west-facing slope, Royal Basin, 1615 m: (pc, not at nmb or onp). Cas.
- Poa rupicola*. Alpine area, vicinity of Buckhorn Pass, 1905–1983 m: (WTU). Generally in Rocky Mt. area. [Chowder Ridge, Mt. Baker (Douglas and Taylor 1970).]
- Puccinellia pumila*. Sand and *Salicornia* mats, Crescent Beach and mouth of Waatch R.: (WS, WTU).
- Stipa lemmonii* var. *lemmonii*. South-facing hillsides, north OP, 183 and 550 m. Generally east of the Cas. [Comox Sandspit, VI (Hubbard 1955); San Juan Island.]

#### Potamogetonaceae

- Potamogeton amplifolius*. Lakes on north, east, and south sides of OP, 10.5–165 m: (WS, WTU).
- Potamogeton berchtoldii*. Widely distributed in suitable habitats on the OP, 10.5–945 m: (WS, WTU).
- Potamogeton illinoensis*. Deep water, Lk. Crescent, 176 m: (WTU).
- Potamogeton obtusifolius*. Shallow water, Lk. Arrowhead, 100 m. West to Minn.; also southern BC. [Minkler Lk., Skagit Co., is the only other Wash. collection seen.]

#### Sparganiaceae

- Sparganium fluctuans*. Deep water, Lk. Ozette, 10.5 m: (WS, WTU). [Idaho (Davis 1955).]
- Sparganium minimum*. Pond, Lilliwaup Swamp area, 229 m. [Mt. Rainier.]

#### Zosteraceae

- Phyllospadix serrulatus* Rupr. Mid-tidal pools, northwest OP: (WS, WTU). [From just west of Kodiak Island to Coos Bay, Oreg. (Phillips 1979).]
- Phyllospadix torreyi*. Sub-tidal, northwest OP: (smc, WS). [VI to Baja Calif. (Phillips 1979).]

### ANTHOPHYTA—DICOTYLEDONEAE

#### Asteraceae

- Antennaria umbrinella*. Subalpine and alpine screes, northeast OM, 1770–1950 m: (WS, WTU).
- Aster radulinus*. Subalpine woods margin and meadow, northeast OM, 1295 and 1370 m: (pc). Olympic plants could be keyed alternatively to *A. sibiricus* var. *meritus*, a taxon that would also be new to the OP.

- Bidens cernua*. Wet places, northeast OP, 5 and 425 m.
- Crocidium multicaule*. Open mossy bench on rock outcrop, Elwha Valley, 180 m: (pc).
- Eriophyllum lanatum* var. *achillaeoides*. Dry open places, lowland to subalpine; most common on the east side, but occurring on gravel bars and dry sites on the western OP: (pc). Lane Co., Oreg., and south.
- Psilocarphus elatior*. Dried margins and bottoms of vernal pools and on sandbars, Calawah drainage, 55–268 m.
- Taraxacum olympicum* G. N. Jones. This epithet has been reduced to synonymy with *T. eriophorum* Rydb. in Hitchcock et al. (1955–1959). Olympic material does not, however, conform to the description of *T. eriophorum* and merits further study. For the present, these plants should probably retain the G. N. Jones epithet. Blue Mt. to Mt. Angeles, 1570–1845 m: (WTU).

#### Balsaminaceae

- Impatiens capensis*. Moist woods margins, southwest Grays Harbor Co., 5–15 m. Rare in the Pacific Northwest (Ornduff 1967). [Ladner, BC; Whatcom Co.] Two hybrid forms resulting from the crossing of *Impatiens capensis* with *I. ecalcarata* (Ornduff 1967) occur here in the presence of the parent species. These represent the spurless-spotted form and the spurred-spotless form. Both are represented at (nmb).

#### Betulaceae

- Alnus incana* subsp. *rugosa* var. *occidentalis*. Wet to flooded stream-banks, John's Cr., Mason Co., 73 m: (pc). Generally east of the Cas. crest. [Near Tacoma.]
- Betula glandulosa* var. *hallii*. Partially drained boggy area, Port Angeles, about 60 m: (pc, V, WS).

#### Brassicaceae

- Arabis hirsuta* var. *glabrata*. Rock outcrops and dry open slopes, north and east OM, 270–1740 m. [Mostly in and east of the Cas. (R. C. Rollins, pers. comm., 27 Jan. 1981).]
- Arabis holboellii* var. *retrofracta*. Rock outcrops and scree in dry areas of the northeast OM, 855–2070 m. Generally east of the Cas.
- Athysanus pusillus*. Dry, often grassy places, north OP, 4–548 m: (pc).
- Cardamine bellidifolia* var. *bellidifolia*. Mt. Ellinor, 1465 m: (WTU, not at nmb or onp). Cas. of Wash., north and east. [Golden Hinde, VI.]
- Draba cana* Rydb. Dry rocky soil, Mt. Tyler, 1770 m: (pc, not at onp). R. C. Rollins states, "This is what has been called *D. lanceolata* Royle, but Mulligan, who has seen the type of *D. lanceolata*, a plant of central Asia, claims that the material does not fit that

species. The next name in line is that of Rydberg." (Pers. comm., 14 Apr. 1981.) In the U.S., Idaho and east. [Cathedral Ridge, BC (Taylor et al. 1973).]

*Draba prealta*. Dry scree meadows in northeast OM, 1767–1830 m: (pc). [Mt. Baker (Taylor and Douglas 1978).]

*Thysanocarpus curvipes*. Dry rock outcrops above Elwha R., 548–640 m: (pc, WTU). Mostly east of the Cas. [Victoria area, VI (Szcza-winski and Harrison 1973); Tacoma.]

#### Campanulaceae

*Downingia yina* var. *major*. Shores of small lakes, southern Mason Co., about 60 m: (pc, V, WS).

#### Caryophyllaceae

*Stellaria nitens*. Rock outcrops and dry hillsides above Elwha R., 76–545 m.

#### Ceratophyllaceae

*Ceratophyllum echinatum* Gray. Lk. Ozette, 10.5 m, and Lk. Arrow-head, 100 m: (V, WS, WTU). West to Minn. (Fernald 1970). [Southern VI (A. and O. Ceska 1980).]

#### Cornaceae

*Cornus unalaschkensis* Ledeb. Although this taxon is reduced to synonymy with *C. canadensis* L. in Hitchcock et al. (1955–1969), Bain and Denford (1979) establish that *C. unalaschkensis* must be treated as a species. Olympic plants, occurring widely in montane habitats, conform to *C. unalaschkensis*. We have not seen specimens of *C. canadensis* from the OP.

#### Crassulaceae

*Sedum lanceolatum* var. *rupicolum*. Dry open areas and rocks, north-east OM, 915–2060 m: (pc). Wenatchee Mts.

*Sedum roseum*. Cliffs, Mt. Pershing area, 1524 m. [Mt. Rainier.]

*Tillaea aquatica*. Exposed mud, shore of Lk. Ozette, 10.5 m: (WS). [Lower Fraser R.]

#### Ericaceae

*Kalmia microphylla*. Wet subalpine meadows and bogs, upper Dungeness drainage, 1675–1830 m: (pc). Cas.

*Pyrola minor*. Moist, usually open woods, northeast OM, 884–1464 m: (pc). [Mt. Rainier.]

#### Euphorbiaceae

*Euphorbia serpyllifolia*. Gravelly lake margin, Shelton area, 60 m: (pc, V). Generally east of the Cas. in Wash. [Yelm and Tacoma (Piper 1906).]

## Fabaceae

*Astragalus microcystis*. Dry scree meadows, upper Dungeness drainage, 1770–1965 m: (BRY, NY, pc, WTU). The collection *J. W. Thompson 7997* of 13 Aug. 1931 (WTU), which was cited in Abrams (1940–1960), was omitted from Barneby (1964) because the OM source of the collection was considered so unlikely that a mixup of labels was suspected (R. C. Barneby, pers. comm., 8 Mar. 1979). [Extreme northeast Wash. (Barneby 1964).]

*Lupinus microcarpus* var. *microcarpus*. Sandy beach bluff, east side Discovery Bay, 45 m: (pc). Generally east of the Cas. Flower color of this population is reddish purple, rather than the pale yellowish characteristic of the var. *scopulorum* of southern VI and adjacent islands.

*Lupinus polyphyllus* var. *pallidipes*. Moist forest opening, Skokomish R., 10 m.

## Grossulariaceae

*Ribes triste*. Wet meadows and streambanks, northeast OM, 792–1402 m: (pc). Cas.

## Hydrophyllaceae

*Phacelia linearis*. Sandspit, Chehalis R., sandy west-facing beach bluffs, northeast OP, and from 975–1050 m on Mt. Maynard: (pc, WTU).

## Lamiaceae

*Lycopus americanus*. Lake shore, Shelton area, 60 m: (pc, V).

## Lentibulariaceae

*Utricularia intermedia*. Shallows, Lk. Ozette, 10.5 m (V, WS). [Southern VI (Ceska and Bell 1973).]

*Utricularia minor*. Shallows, Lk. Ozette, 10.5 m. [Southern VI (Ceska and Bell 1973); Olympia (Piper 1906).]

## Onagraceae

*Epilobium watsonii* var. *parishii*. Scattered at lower elevations on the OP.

*Ludwigia palustris* var. *pacifica*. Gravelly seep near Lk. Ozette, 15 m: (WS).

## Orobanchaceae

*Orobanche californica* var. *californica*. Upper beach, Pt. Wilson: (WTU).

*Orobanche pinorum*. Dry open woods, Elwha Valley, 550 m: (pc, not at nmb or onp). [Cowichan Lk., VI.]



## Oxalidaceae

*Oxalis suksdorfii*. Seaward edge of eroding high beach meadow, Mukkaw Bay, a solitary find that may not represent an established population: (not at onp). Generally southern Wash. and south. [Kitsap Co. (WNHP, 1981).]

## Plantaginaceae

*Plantago major* var. *pachyphylla*. High beach, north shore, Grays Harbor.

## Polemoniaceae

*Microsteris gracilis* var. *humilior*. Dry open places, east half of OP, 75–915 m. Generally east of the Cas. crest. [Lacey, Thurston Co.]

## Polygonaceae

*Polygonum majus*. Patch of bare soil on hillside above Copper Cr., 1315 m. [Marblemount, Skagit Co. (D. B. and R. W. Naas, pers. comm.).]

*Polygonum viviparum*. Wet meadows and seeps, northeast OM, 1403–1996 m: (pc). [Forbidden Plateau, VI (Hardy 1954).]

## Portulacaceae

*Calandrinia ciliata*. Open south-facing hillside, north OP, 183 m.

*Montia chamissoi*. Boggy meadow, Blue Mt., 1630 m. Generally in or east of the Cas. [Roy, Pierce Co. (Piper 1906).]

*Montia linearis*. "Wet land, Sequim": (WTU, not at nmb or onp).

*Montia spathulata* (Dougl.) Howell. High beach and sand dunes, southwest and northeast OP.

## Ranunculaceae

*Anemone deltoidea*. Vernal wet shrubby meadow, Mt. Ellinor, 1375 m: (ups, not at nmb or onp).

*Caltha biflora* var. *rotundifolia*. Wet forest opening with north exposure, Pine Mt. area, 885 m. Occasional in the Cas. [Jordan Meadows, VI.]

*Ranunculus glaberimus* var. *ellipticus*. Dry scree meadows, northeast OM, 1676–1830 m: (pc). East of the Cas.

*Ranunculus verecundus*. Alpine meadows and talus, northeast OM, 1738–2010 m: (pc, WTU). Cas.

## Rosaceae

*Sanguisorba sitchensis*. Big Cr. Prairie, 45 m, and Mink Lk. and sedge meadow above, 945 and 960 m: (WS, WTU). Mink Lk. plants in Buckingham collection were growing with *S. menziesii* and with intermediate plants (both at nmb). Cas. and east. [Forbidden Plateau, VI (Hardy 1954).]

*Spiraea betulifolia* var. *lucida*. Mt. Walker and Mt. Jupiter, 260–1370 m: (pc, not at onp). Generally in and east of the Cas. [Olympia.]

#### Rubiaceae

*Galium bifolium*. “One-half mile above Dose Meadows along Lost Pk. trail, growing in old elk trail at 4000 feet” (1220 m): (WTU, not at nmb or onp). Generally east of the Cas. [Hart’s Pass.]

*Galium kamtschaticum*. Moist forest, upper Humptulips drainage, 590 m: (pc, not at onp). In western U.S. known only from Stevens Pass, Cas.

*Kelloggia galioides*. Dry open woods at 1675 m, and consolidated talus at cliff base, 1830 m, upper Dungeness drainage: (pc). Generally east of the Cas. crest.

#### Salicaceae

*Salix brachycarpa* var. *brachycarpa*. North-facing rocky meadow, Maiden Pk., 1905 m: (V, WS). Kittitas Co.

*Salix geyreriana* var. *meleiana*. Swamps, John’s Cr. area near Shelton, 70 m: (pc).

#### Saxifragaceae

*Lithophragma bulbifera*. Subalpine rocks and scree meadows, northeast OM, 1650–1740 m. Generally east of the Cas. crest. [Southern VI.]

*Parnassia palustris* var. *neogaea*. Wet rocks and subirrigated meadows to 930 m, southwest OM: (smc). Generally north of Wash. [Lillooet area, BC.]

*Saxifraga debilis*. Damp cliffs and rock crevices, northeast OM, above 1740 m: (WTU). Cas.

*Tiarella trifoliata* var. *laciniata*. Morse Cr. drainage, 1188 m, and Skokomish drainage, 580 m: (pc).

#### Scrophulariaceae

*Lindernia anagallidea*. Wet potholes near Shelton airport, 60 m. [Mt. St. Helens.]

*Scrophularia lanceolata*. Satsop R. banks, 58 m: (WS, WTU).

*Tonella tenella*. Open woods and rock outcrops above Elwha R., 305–457 m. Generally south of the Columbia R. [Saltspring Island, BC (Douglas and Douglas 1978).]

#### Umbelliferae

*Osmorhiza depauperata*. Margins of subalpine fir clumps, north OM, about 1830 m: (WTU). Generally east of the Cas. crest.

*Sanicula bipinnatifida*. Consolidated upper beach, Marrowstone Pt., 3 m, and sandy beach bluff, east side Discovery Bay, 45 m: (pc).

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